Grace Lentz

My Dad loves to tell my siblings and I how easy we have it in the mornings. When we complain about having to roll out of bed at 7, my dad will usually reply with one of these three things: I had to get up at sunrise before school to milk the cows, I threw square bales in 100-degree summer weather, or my personal favorite, I had to walk to school uphill both ways. If my family lived on a dairy farm today like my dad grew up on, our chores would be less strenuous, thanks to modern technology. Today's dairy farmers certainly work hard but thanks to technology like robotic milkers, computer controlled feeding systems, and a fleet of machines, they get to work smarter instead of harder.

Back in 1920 when the first milking machines were invented, they were the latest technological wonder for agriculture. Up until then, most cows were milked by hand and one farmer could only have 10-15 milk cows on his farm. By embracing this new technology, dairy farmers could now have herds of 30 or 40 cows. Many of today's dairy farms have thousands of cows and multiple cow rotatory parlors. Computer controlled chips in each cow allows for the right amount of feed, tracks their production, and even tells the farmer when a cow is getting sick.

Technology in the ag sector is nothing new, but the technological revolution we have seen in the last few decades is very impressive. From auto steer tractors to genetically modified crops, we have improved the efficiency of agriculture beyond our wildest dreams. Back in the 1940s, one farmer could grow enough food for 15 people; today a typical farmer can grow enough food for hundreds of people.

According to J.B. Penn, the Chief Economist for John Deere agriculture we have experienced four major technological eras in the last Century. The first was mechanization. In 1915, there were 25 million horses used on farms and ranches. Today the work performed by

those horses is done by tractors, combines, and other machinery. The next advancement was crop hybrids and genetics. A great example of this was corn. From the mid eighteen hundreds until the 1940's, corn averaged less than 40 bushels/acre. After the development of hybrids, corn yields began increasing dramatically and today the average US yield is close to 170 bushels/acre. After WWII chemical fertilizers and pesticides were introduced and together, they further boosted yields. In the early 1990's genetically modified organisms or GMO's for short helped yields increase by improving plants ability to fight off pests and allowing the use of new herbicide technologies.

So, where is the future of agricultural technology headed? Some of the most recent technology advances include computer technology, satellites, yield monitors, and drones. How do these help improve efficiency on the farm? Autosteer in tractors can assure there is no overlapping during planting, spraying or fertilizing which not only saves the farmer money but also helps the environment by assuring chemicals and fertilizer is not over applied. According to Penn, in 1850 it took 83 hours of labor and 2.5 acres to grow 100 bushel of corn, today it only takes 2 hours of labor and ½ acre of land to produce the same 100 bushels.

Some technologies being worked on also include the use of robotics; we already see this in some segments of the Ag industry such as robotic milkers. But what about robots that roam through fields killing weeds, or picking fruit, or building a fence. We are continuing to make advancements every day and we might not be too far out from these systems.

My family recently visited Disney world and we toured an exhibit at Epcot called Living with the Land. During the boat tour, it showed a lot of new concepts including aquaculture, vertical agriculture, and conservation measures. One design merged aquaculture and vertical agriculture together. The fish tank water was cycled through vegetables, which not only watered

and fertilized the plants but also cleaned the water which was then recirculated into the fish tanks. This is a great example of thinking outside the box that future generations will use to continue advancements. By 2050 over 80 percent of the global population will live in cities. Vertical agriculture could be one way to provide more food closer to the population base.

So as you can see technology has already made farming and ranching more efficient, less labor intensive, as well as more profitable and sustainable. Will future technologies create cows that really do give chocolate milk or robots that weed our gardens and make our beds? Who knows? But one thing we know for sure is technology will continue to provide great opportunities for agriculture. My great grandfather probably couldn't have even imagined a robot milking a cow and now it's a reality. The future for agriculture is looking very promising.